

REMARKS

This is in response to the Office Action mailed March 14, 2006, in which the Examiner withdrew claims 2-6, 20-23 and 25-30 from consideration and rejected claims 1, 7, 8, 19, 24 and 31-36. Reconsideration of the application is respectfully requested.

Objection to the Title

In Section 3 of the Office Action, the Examiner objected to the title as being non-descriptive. Applicant has amended the title as suggested by the Examiner, and requests that the rejection be withdrawn.

Claim Rejections - 35 U.S.C. §103

In Section 5 of the Office Action, the Examiner rejected claims 1, 7, 8, 19, 24, 31-34 and 36 under 35 U.S.C. §103(a) as being unpatentable over the combination of Knapp et al. (U.S. Patent No. 6,417,999), Tao et al. (U.S. Patent No. 6,737,286), and Segar et al. (U.S. Patent No. 6,368,425). Applicant respectfully believes that the Examiner has failed to establish a *prima facie* case of obviousness against the claims because the references fail to disclose all of the claimed features and there is no suggestion or motivation to combine the cited references.

In rejecting independent claims 1, 19 and 31, the Examiner found Knapp et al. to disclose a method of forming a magnetoresistive sensor that includes forming first and second magnetic leads (230) and a junction (253) between the leads. However, the Examiner did not find Knapp et al. to disclose "reducing the magnetic and electrical conductivity of an outer shell portion of the junction, thereby forming a constricted junction comprising a magnetic and electrically conductive junction core that is at least partially surrounded by the outer shell portion" as provided in claim 1 (hereinafter "reducing step

of claim 1"), "reducing the magnetic and electrical conductivity of an outer shell portion of the junction by implanting ions of a non-ferromagnetic element into the outer shell portion of the junction" as provided in claim 19 (hereinafter reducing step of claim 19), or "implanting ions of a non-ferromagnetic element into an outer shell portion of the junction" as described in claim 31 (hereinafter "implanting step of claim 31").

However, the Examiner found the combination of Tao et al. and Segar et al. to disclose the claimed reducing steps of claims 1 and 19 and the implanting step of claim 31. That finding is erroneous.

Tao et al. relates to methods of forming atomic scale contacts and atomic scale gaps between electrodes and is unrelated to magnetoresistive sensors. Even so, the Examiner found Tao et al. to disclose "that a constricted junction can be formed by implanting ions onto an outer shell portion of the core (region between leads 70 and Fig. 9) for the purpose of substantially bridging the first and second magnetic leads (col. 10, lines 1-3)." However, region 74 between the gold leads 70 in Fig. 9 is formed of palladium (Pd), both of which are non-magnetic materials.

Thus, not only do Tao et al. fail to disclose any implantation of ions into a magnetic material, they fail to disclose any method of forming a constricted junction or the implantation of ions into a magnetic junction between first and second magnetic leads during the forming of a magnetoresistive sensor.

Therefore, Tao et al. fail to disclose the reducing step of claim 1, the reducing step of claim 19 or the implanting step of claim 31.

With regard to Segar et al., the Examiner found the reference to show "that magnetic leads that are formed as a junction in general, can by ion implanted with non-ferromagnetic

elements of boron or chromium for the advantage of improving magnetic properties (see Fig. 4 and col. 5, lines 35-56).” However, the Segar et al. is unrelated to the formation of a constricted junction in a magnetoresistive sensor.

Rather, the Segar et al. describes the implantation of ions to “improve the tribology at the interface between the recording medium 12 and the head 8” [col. 5, lines 31-33] Within the section cited by the Examiner, the disclosure provides “[i]mplanting such reactive ions can help improve various properties of the pole tips 32 and the air bearing surfaces 14 of the substrate 34, including their hardness, their elastic and plastic behavior, and the resistance to corrosion.” [col. 5, lines 45-49] In addition to being unrelated to the formation of a constricted junction in a magnetoresistive sensor, the cited section of Segar et al. fails to disclose the reducing step of claim 1, the reducing step of claim 19, or the implanting step of claim 31.

Because neither Tao et al. nor Segar et al. disclose the reducing step of claim 1, the reducing claim of claim 19, or the implanting step of claim 31, the Examiner found the references to inherently disclose the reducing step. In particular, the Examiner found “[w]ith respect to the limitations of ‘reducing the magnetic and electrical conductivity of an outer shell portion of the junction’ . . . these limitations are inherently met by Tao and Segar to the extent that Segar utilizes the very same material (e.g. boron or chromium) as the applicant(s) and Tao utilizes other non-ferromagnetic elemental materials, both of which would achieve the properties of reducing the magnetic and electrical conductivity of an outer shell portion of the junction.” The Examiner’s finding is misguided.

An element can only be inherent in the prior art when it is necessarily present, but not expressly described or recognized. For example, a previously unappreciated property of a prior art

composition, or a scientific explanation for the prior art's functioning does not render the old composition patentably new to the discoverer. There is nothing in the reference that would inherently disclose the ion implantation of a non-ferromagnetic element into a magnetic junction of a magnetoresistive sensor, such as described in claims 19 and 31.

Accordingly, the Examiner has failed to establish a *prima facie* case of obviousness against claims 1, 19 and 31 because the cited references fail to disclose all the claimed features.

Applicant also submits that the Examiner has failed to establish a *prima facie* case of obviousness against independent claims 1, 19 and 31 because there is no suggestion or motivation for combining the cited references outside of Applicant's disclosure.

In justifying the combination of the references, the Examiner found that "[it] would have obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Knapp by including the ion planting process of both Tao and Segar, for the associated advantages of improving magnetic properties and bridging the first and second magnetic leads in manufacturing the MR sensor."

The Examiner's finding of a suggestion or motivation to combine the references is erroneous for at least two reasons. First, nowhere in the cited section of Segar et al. was there any suggestion of "improving the magnetic properties" in the manner resembling the formation of a constricted junction in a magnetoresistive sensor as described in claims 1, 19 and 31. Second, there is no need expressed in Knapp et al. to "bridge" the cited magnetic leads 230, since element 253 apparently serves that function.

Additionally, the mandate of 35 U.S.C. §103 is that the invention as a whole must be considered in a obviousness determination. A diversion of purpose between the claimed element

and a corresponding element of a prior art reference is the basis for finding that the combination is not suggested. Thus, an important consideration in deciding whether an invalidating suggestion is present, is a comparison of the purpose, functions, and problems addressed by the present invention and that of the cited references.

One purpose addressed by the present invention and described in independent claims 1, 19 and 31 is to form a magnetoresistive sensor that is highly sensitive. Neither Tao et al. nor Segar et al. share a similar purpose. Additionally, in accordance with embodiments of the invention, the purpose of creating a highly sensitive magnetoresistive sensor is accomplished by creating a constricted junction between magnetic leads as described in independent claims 1, 19 and 31. Neither Tao et al. nor Segar et al. address the formation of a constricted junction, let alone a constricted junction in a magnetoresistive sensor.

As a result, the Examiner must rely on the teachings of Applicant's disclosure to discern the "obviousness" of the claimed invention since, without Applicant's disclosure, neither the Examiner nor one skilled in the art would attempt to combine the cited teachings. For instance, the Examiner would not have found the "inherent" teaching of Tao et al. and Segar et al. mentioned above without the guidance of Applicant's disclosure, since the references have no relation to the formation of a constricted junction in a magnetoresistive sensor. Such use of hindsight is clearly improper. In re Lee, 61 USPQ2d 1430 (Fed. Cir. 2002) ("It is improper, in determining whether a person of ordinary skill in the art would have been led to this combination of references, simply to '[use] that which the inventor taught against its teacher.'") (quoting W.L. Gore v. Garlock, Inc., 220 USPQ 303, 312-13 (Fed. Cir. 1983)).

Accordingly, Applicant submits that the Examiner has failed to establish a *prima facie* case of obviousness against the

claims, and requests that the rejections of independent claims 1, 19 and 31 be withdrawn. Additionally, Applicant submits that each of the rejected claims that depends from independent claims 1, 19 and 31 is allowable for at least the reasons set forth above.

In Section 6 of the Office Action, the Examiner rejected claim 35 under 35 U.S.C. §103(a) as being unpatentable over Knapp et al., Tao et al., and further in view of Mao et al. (U.S. Patent No. 6,411,478). Applicant respectfully believes that claim 35 is allowable for at least the reasons set forth above with regard to claim 31, from which it depends. Accordingly, Applicant requests that the rejection be withdrawn.

Conclusion

In view of the above comments and remarks, Applicant believes that the present application is in condition for allowance. Reconsideration and favorable action is respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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